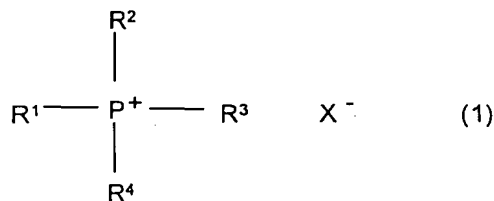


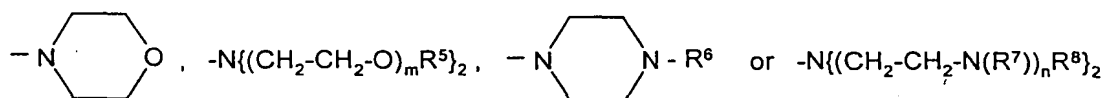
CLAIMS:

1. A compound of the formula



5

in which one, two or three of the radicals R^1 , R^2 , R^3 and R^4 are



where m and n are an integer from 1 to 10, R^5 , R^6 , R^7 and R^8 are, independently of one another, identical or different and are a straight-chain or branched alkyl radical

10 having 1 to 10 carbon atoms, and the remaining radical(s) R^1 to R^4 are

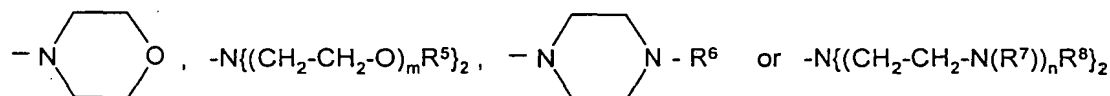


or $-\text{NR}^9\text{R}^{10}$, where R^9 and R^{10} are identical or different and are a straight-chain or branched alkyl radical having 1 to 10 carbon atoms,

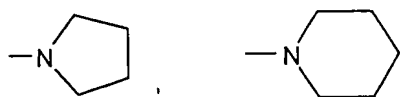
and X^- is an inorganic or organic anion or an equivalent of a multiply charged

15 inorganic or organic anion.

2. A compound as claimed in claim 1, wherein one or two of the radicals R^1 , R^2 , R^3 and R^4 are



20 and the remaining radicals R^1 to R^4 are



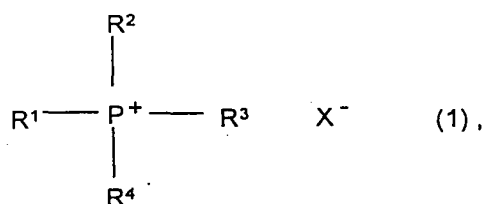
or $-\text{NR}^9\text{R}^{10}$.

3. A compound as claimed in claim 1, wherein m and n are an integer from 1 to 6, and R^5 , R^6 , R^7 , R^8 , R^9 and R^{10} are identical or different and are a straight-chain or branched alkyl radical having 1 to 4 carbon atoms.

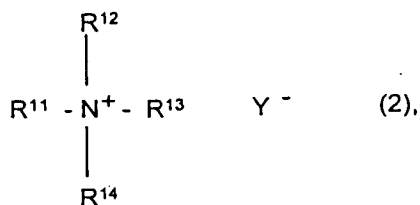
5 4. A compound as claimed in claim 1, wherein X^- is F^- , Cl^- , Br^- , I^- , ClO_4^- , BF_4^- , PF_6^- , NO_3^- , HSO_4^- , $\frac{1}{2} SO_4^{2-}$, $H_2PO_4^-$, $\frac{1}{2} HPO_4^{2-}$, $\frac{1}{3} PO_4^{3-}$, R^1-COO^- , where R^1 is an alkyl radical having 1 to 9 carbon atoms, a phenyl radical, benzyl radical or naphthyl radical, $R''-SO_3^-$, where R'' is an alkyl radical having 1 to 18 carbon atoms, a phenyl radical, tolyl radical or naphthyl radical, HCO_3^- , $\frac{1}{2} CO_3^{2-}$ or $\frac{1}{2} C_6H_4(COO^-)_2$.

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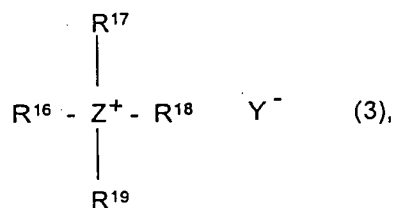
5. A mixture of substances comprising at least one compound of the formula



15 in which R^1 , R^2 , R^3 , R^4 and X^- have the above meaning, and at least one compound selected from the group of quaternary ammonium compounds of the formula



20 quaternary ammonium salts or phosphonium salts of the formula



polyethers of the formula $R^{20}-(O-C_xH_{2x})_s-OR^{21}$ (4) and crown ethers,

in which in formula (2) R^{11} , R^{12} and R^{13} are identical or different and are a linear or branched radical of the formula $-(C_pH_{2p}O)_rR^{15}$ in which R^{15} is hydrogen or a linear or branched alkyl radical having 1 to 16 carbon atoms, p is an integer from 1 to 10, and r is an integer from 1 to 15;

or a linear or branched alkyl radical having 1 to 30 carbon atoms;

or an unsubstituted phenyl or naphthyl radical, or a substituted phenyl or naphthyl radical, where the substituents have the meaning of halogen, C_1 - C_4 -alkyl, C_1 - C_4 -alkoxy, nitro or cyano;

R^{14} is a linear or branched radical of the formula $-(C_pH_{2p}O)_rR^{15}$ and Y^- is an inorganic anion;

and in formula (3)

R^{16} , R^{17} , R^{18} and R^{19} are identical or different and are a linear or branched alkyl radical having 1 to 22 carbon atoms; or an unsubstituted or substituted aryl radical or a C_1 - C_4 -alkylaryl radical, where aryl has the meaning of phenyl or naphthyl, and said substituents are halogen,

C_1 - C_4 -alkyl, C_1 - C_4 -alkoxy, nitro or cyano; Z has the meaning of N or P, and Y^- is an inorganic anion;

and in formula (4)

R^{20} and R^{21} are identical or different and are a linear or branched alkyl radical having 1 to 16 carbon atoms;

x is an integer from 2 to 6 and

s is an integer from 1 to 60;

or one of the radicals R^{20} and R^{21} is hydrogen and the other one of the radicals is a linear or branched alkyl radical having 1 to 16 carbon atoms,

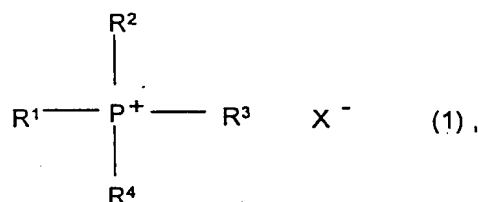
x is an integer from 2 to 6 and s is an integer from 2 to 50, or the radicals R^{20} and R^{21} are hydrogen, x is an integer from 2 to 6 and s is an integer from 3 to 5.

6. A mixture of substances as claimed in claim 5, which comprise at least one compound of the formula (1) and at least one compound selected from the group of quaternary ammonium compounds of the formula (2), quaternary ammonium salts and phosphonium salts of the formula (3), polyethers of the formula (4) and crown ethers, in which in formula (2) R^{11} , R^{12} and R^{13} are identical or different and are a

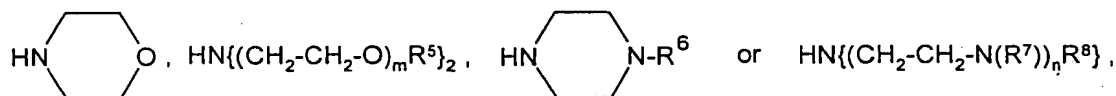
linear or branched radical of the formula $-(C_pH_{2p}O)_rR^{15}$ in which R^{15} is hydrogen or a linear or branched alkyl radical having 1 to 8 carbon atoms, p is an integer from 1 to 5 and r is an integer from 2 to 10; or a linear or branched alkyl radical having 1 to 18 carbon atoms; or an unsubstituted phenyl or naphthyl radical; R^{14} is a linear or branched radical of the formula $-(C_pH_{2p}O)_rR^{15}$, in which R^{15} is hydrogen or a linear or branched alkyl radical having 1 to 8 carbon atoms, p is an integer from 1 to 5 and r is an integer from 2 to 10; and X^- is fluoride, chloride, bromide, $SO_4^{2-}/2$ or hydrogen sulfate.

- 10 7. A mixture of substances as claimed in claim 5, which comprises at least one compound of the formula (1) and at least one compound from the group of quaternary ammonium compounds of the formula (2).

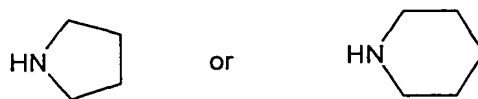
8. A process for preparing compounds of the formula



15 which comprises reacting a phosphorus pentahalide in the presence of an inert solvent at from -70 to 140°C with from 1 to 6 mol of



20 per halogen equivalent to be exchanged, and subsequently reacting the reaction product with from 1 to 10 mol of



or $\text{HNR}^9\text{R}^{10}$ per halogen equivalent still to be exchanged.

- 25 9. The process as claimed in claim 8, wherein PCl_5 or PBr_5 is employed as phosphorus pentahalide.

10. The process as claimed in claim 8, wherein an aliphatic, cycloaliphatic or aromatic hydrocarbon or a mono- or polychlorinated aliphatic, cycloaliphatic or aromatic hydrocarbon is employed as inert solvent.

5 11. The use of a compound of the formula (1) as catalyst and cocatalyst for phase-transfer reactions, nucleophilic substitutions and halogen-fluorine exchange reactions.

10 12. The use of a mixture of substances comprising at least one compound of the formula (1) and at least one compound selected from the group of quaternary ammonium compounds of the formula (2), quaternary ammonium salts or phosphonium salts of the formula (3), polyethers of the formula (4) and crown ethers as catalyst for phase-transfer reactions, nucleophilic substitutions and halogen-fluorine exchange reactions.